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REMARKS

Disposition of Claims

Upon entry of the foregoing amendments, claims 1-22 will remain pending in the application and stand ready for further action on the merits. Claim 1 has been amended to clarify that the cartridge comprises a piston and the method for extruding the dental material includes the step of applying force to the piston so that the material is extruded through the nozzle. As set forth in amended claim 1, the nozzle includes a cylindrical nozzle channel having a substantially uniform diameter and an inner channel wall that encloses the nozzle channel. In FIG. 4A, the nozzle channel is called out as element (66). Claim 5 has been amended to make it consistent with amended claim 1. Claims 6, 7, 8, and 9, which are dependent upon amended claim 1, have been amended likewise to clarify that diameter (D_2) refers to the diameter of the cylindrical nozzle channel (66). In addition, independent claim 11 has been amended to clarify that the nozzle includes a cylindrical nozzle channel having a substantially uniform diameter (66); the inner nozzle wall encloses the nozzle channel, and the effective diameter of the nozzle channel is D_2 . The amendments are fully supported by the specification, particularly at page 3 (paragraph 2), page 4 (paragraph 2), page 5 (paragraph 3), and the drawings. Claim 23 was canceled in a previous amendment.

Claim Rejections

The Office Action first rejects claims 1-10 under 35 U.S.C. § 112, second paragraph as being indefinite, because the preamble recites a method of extruding dental material, and it is asserted that the claim as originally written does not include an extrusion step. Claim 1 now has been amended to clarify that the cartridge comprises a piston and the method includes the step of applying force to the piston so as to extrude the material. Claims 2-10 are ultimately dependent upon amended claim 1. In view of the amendment to claim 1, it is believed that claims 1-10 meet all of the requirements under 35 U.S.C. § 112.

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Next, the Office Action rejects claims 1-10 under 35 U.S.C. § 103(a) as being unpatentable over Evers et al., U.S. Patent 6,503,084 ("Evers") in view of Schulman, U.S. Patent 5,460,523 ("Schulman"). It is respectfully submitted that the presently claimed invention, as recited in amended claims 1-10, is not prima facie obvious over the combination of Evers and Schulman for the reasons discussed below.

As the Examiner points out, Evers generally discloses a capsule-like cartridge (10) having an elongated body (1) with discharge nozzle (3). The cartridge is filled with high viscosity dental material. The dental material is forced through the discharge nozzle by a piston that slides along the inner walls of the cartridge chamber. Evers fails to disclose a hemispherical end wall portion having a thickness greater than the cylindrical side wall portion. However, the Examiner asserts that it would have been obvious to increase the thickness of the end wall portion in the Evers' cartridge chamber based on the teachings in Schulman.

In response, Applicant respectfully submits that, even if the disclosures in Evers and Schulman were combined, the presently claimed invention would not be obvious to a person of ordinary skill in the art.

First, the Examiner refers to FIG. 2 in Evers asserting that the "inner channel wall of the nozzle has a diameter D_1 (at least at one point) which is significantly greater than the diameter of the chamber wall exit port D_1 ." Applicant submits that the nozzle in FIG. 2 of Evers includes an entrance portion having a relatively narrow diameter (D_1) and a discharge portion having a relatively wide diameter (D_2). That is, the diameter of the nozzle channel described in Evers is not the same along its length. The channel of the nozzle (3) significantly tapers off from the discharge portion (D_2) to the entrance portion (D_1). The diameter of the nozzle channel clearly varies along its length. As shown in FIG. 2 of Evers, the width of

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the nozzle is substantially different at the discharge area versus the entrance area. The nozzle structure in Evers differs significantly over Applicant's nozzle structure.

As opposed to the Evers' cartridge, Applicant's cartridge has a cylindrical nozzle with a substantially uniform diameter as recited in amended claims 1-22 above. That is, the diameter of Applicant's nozzle channel is substantially the same along its length. Referring to FIG. 4A in the specification, the nozzle channel (66) with its constant diameter is clearly illustrated. Clearly, this nozzle structure (66) is different than the nozzle structure shown in FIG. 2 of Evers.

Secondly, turning to the cartridge (10) shown in Schulman, it is noted that the discharge nozzle (14) is distinct from the cylindrical body (12). These two components are conjoined at a planar end wall.

The intersection of the discharge end (18) of the body (12), and the discharge nozzle (14) defines a planar end wall (32). The planar end wall intersects the body 12 at an angle relative to the longitudinal axis of the body 12. (Col. 2, lines 55-58).

Applicant's cylindrical nozzle structure does not include a planar end wall surface as shown in the cartridge of Schulman.

Thirdly, the wall thickness of the cylindrical body (12) in the cartridge (10) of Schulman is uniform along its length. There is absolutely no variation in thickness - the open end portion (16) has the same thickness as the discharge end portion (18). This differs significantly from the present invention, where the wall thickness of the elongated chamber body varies along its length. Particularly, in Applicant's cartridge (2), the elongated body includes an end wall (54) having a substantially greater thickness than the body wall (48) as shown in FIGS. 3, 4, and 6. Preferably, the thickness of the end wall (54) is at least 20% greater than the thickness of the

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cylindrical body wall (48) as discussed at page 4 of the specification.

Schulman does not disclose a cartridge having an end wall portion with a substantially greater thickness than the side walls. As the Examiner points out, in Schulman "the discharge nozzle is designed as such to withstand the pressure exerted by the plunging piston, which will be greater near the end wall than near the discharge opening." (col. 3, lines 51-54). So Schulman designs a discharge nozzle having a variation in wall thickness. But, Schulman is only interested in a discharge nozzle, not a cylindrical body. There is no hint or suggestion whatsoever in Schulman for a cylindrical body having variable wall thickness.

As discussed above, even if the disclosures in Evers and Schulman were combined, we do not believe a person of ordinary skill in the art would have any basis for making the cartridge of the present invention. Accordingly, it is respectfully requested that the rejection of claims 1-10 (as amended) under 35 U.S.C. § 103(a) in view of Evers and Schulman be withdrawn.

The Office Action further rejects claims 11-22 under 35 U.S.C. § 103(a) as being unpatentable over Evers in view of Schulman and Bender, U.S. Patent 5,707,234 ("Bender"). It is respectfully submitted that the presently claimed invention, as recited in amended claims 11-22, is not prima facie obvious over the combination of Evers, Schulman, and Bender for the reasons discussed below.

The teachings in Evers and Schulman and how the present invention differs therefrom are discussed above. Concerning the Bender reference, Applicant agrees with the Examiner that Bender discloses a capsule (34) containing dental material. The body portion of the capsule (34) is cylindrical and the closed end portion (62) is preferably hemispherical. As the Examiner notes, there is a piston (66) having a complementary shape to the interior shape of the capsule

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(34) for extruding the material. However, as also shown in FIG. 9 of Bender, the cylindrical wall of the cartridge has a substantially uniform thickness.

The intermediate body portion of the capsule (34) is of uniform interior and exterior diameter and extends from the annular flange (56) adjacent the open end of the cartridge to the opposite closed end (62).
(Col. 4, lines 53-56).

Bender does not disclose a cartridge having an end wall portion with a substantially greater thickness than the side walls.

Even if the disclosures in Evers, Schulman, and Bender were combined, we do not believe the cartridge of the present invention would be obvious to a person of ordinary skill in the art. It is respectfully requested that the rejection of claims 11-22 (as amended) under 35 U.S.C. § 103(a) in view of Evers, Schulman, and Bender be withdrawn.

Lastly, the Office Action objects to the informal drawings filed with the application on December 4, 2003. In response, a set of formal drawings (Figures 1-15) is attached hereto. It is believed that the attached drawings meet all Patent Office requirements and should be accepted.

Conclusion

In summary, Applicants submit that claims 1-22 as amended are patentable and each of the Examiner's rejections and objections has been overcome. Accordingly, Applicants request favorable consideration and allowance of amended claims 1-22.

The Commissioner is hereby authorized to charge any additional fee required in connection with the filing of this paper or credit any overpayment to Deposit Account No. 04-0780. Should there be any outstanding matter that needs to be resolved in the present

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application; the Examiner is invited to contact the undersigned at the telephone number provided below.

Respectfully submitted,

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Attachments: Petition for Extension of Time
Formal Drawings (Figures 1-15)